

Chapter 1

THE GENOME PROJECT: ITS IMPACTS AND IMPLICATIONS

“We wish to suggest a structure for the salt of deoxyribonucleic acid (DNA). This structure has novel features which are of considerable biological interest.”

J.D. Watson and F.H.C. Crick, *Nature*, 25 April 1953.

1 Looking Back In The Future

The new millennium just started. It may sound utterly ridiculous at this juncture to ask the question by the year 3000 when historians look back on the 21st century and try to record important events that occurred during the century, what they will have to jot down in their history books. Though only a few months old, the new millennium is already very eventful — the human genome project (June 2000), Bush-Gore presidential tug-of-war (November 2000), collapse of the World Trade Center towers (September 11, 2001) — not to mention all the excitements and social upheavals about the anticipated implications, impacts and repercussions.

In historical records there is a plentiful account of lives of societies, royalty, empire builders, but not much is known about the average people. History books remember ancient civilizations like the Mayans, Incas, Egyptians, Chinese and Indians; conquerors like the Greeks and Romans; maritime powers like the Portuguese, Spanish, Dutch and English; and space explorers like Yuri Gagarin, Neil Armstrong. History also remembers individual empire builders: Alexander the Great, Caesar, Qin Huang Ti, Akhbar the Great, Genghis Khan, Peter the Great, and Napoleon. History books are also populated with people with great ideas: Aristotle, Archimedes, Confucius, Shakespeare, Newton, and Einstein. Noteworthy in history books are explorers: Columbus, Magellan, Marco Polo, Admiral Cheng Ho and others. In historical footnotes are many inventions and presidents.

Events worth recording have come far in between in the past. In modern times, historical records will be very different. First, with rapid advances in technology, historical records will be recorded more often. Second, modern recording mechanisms are much more efficient, and the recording mediums are much more sophisticated, reliable and accurate. Third, royal pedigrees are a disappearing breed, and more room will be allocated for empire builders of another kind. As we understand genetics better, we also disprove the existence of royal blood.

Today building geographical empires has become irrelevant. With land and natural resources much less important to building a wealth pyramid since geographical empires do not create the wealth they used to. It costs more to build them than gaining from having them. This is why in the past half a century, the French, the British, the Russians have all given up their empires. But it is equally

certain that as knowledge rises in importance to the construction of a modern wealth pyramid, those that create big technological breakthroughs will be remembered as the empire builders of our current knowledge-based economy. They redefine humanity's future.

2 Lewis-Clark Dé Jàvu

On June 26, 2000, at a photo-opportunity ceremony at the White House attended by Craig Venter, President of Maryland-based Celera Genomics,¹ Francis Collins, director of the National Human Genome Research Institute, and the U.S. President William Jefferson Clinton, a historical moment was defined. As the doors to the ornate East Room of the White House slid open, President Clinton strode in flanked by Collins and Venter. “Today the world is joining us here in the East Room to behold a map of even greater importance,” Clinton said, “Without a doubt, this is the most important, most wondrous map ever produced by humankind.”



Figure 1. President Bill Clinton, flanked by Celera Genomics head Craig Venter (to his right) and Francis Collins, head of the Human Genome Project of the National Institutes of Health, meets reporters in the East Room of the White House. (Photo: Courtesy of Associated Press).

For people familiar with history and the White House, two centuries ago in 1806, President Thomas Jefferson had stood in the same room to view “a magnificent map” of North America produced by the Lewis-Clark expedition. The map Bill Clinton was referring to is the first draft of the human genome. Note the words used by Clinton, “of even greater significance”, is there a deeper implication in the message? Was President Clinton trying to put his footprints in the sands of history by drawing the parallel between the human genome project and the Lewis-Clark expedition?² The Lewis-Clark expedition would later open up national trade in the U.S. The genetic map marks an epic and is expected to put the U.S. in a dominant position in the global trade of a different kind in a very different knowledge-based economy.

¹ <http://www.celera.com>

² Irving W. Anderson, "A history of Lewis and Clark Expedition", <http://www.lewisandclark.org/pages/story0.htm>